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### (54) Bottle closure with anti-refill valve

(57) An antifilling closing device for bottles, or similar, comprises a pouring device (1), meant for forcing and sealing engagement into the mouth (2) of a bottle (B), or similar. The pouring device has a plugging body (6), which is held in one passage chamber (4) between at least one pouring opening (11) and one passage opening (5) communicating with the inside of the bottle (B), and interacting with the plugging body (6). The compartment (1) for the plugging body (6) inside the pouring device (1) is closed at its outward end by a part of the pourer, which is connected to the rest of it by predeterminedly breaking zones (13, 13'), which are meant to break, irremediably damaging the pouring device when an attempt is made to remove it from the mouth of the bottle. According to the invention, the predeterminedly breaking zones (13, 13') between the two parts of the pouring device (1) are made of at least one weakened wall and have an at least inclined or perpendicular orientation with respect to the direction of its removal from the mouth (2) of the bottle (B).

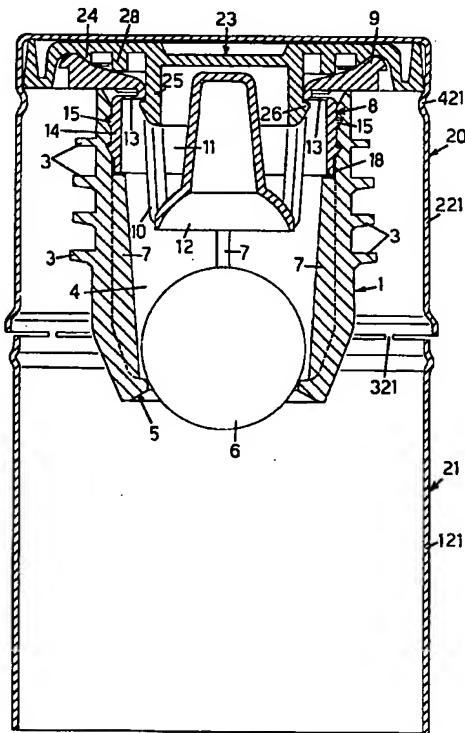


FIG.1

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## Description

The invention relates to an antifilling closing device for bottles, or similar, comprising a pouring device, more simply named pourer, and meant for an at least partial forcing and sealing engagement into the mouth of a bottle, or similar, and comprising a plugging body, generally a ball, which is held in one passage chamber between at least one exit or pouring opening and one passage opening which communicates with the inside of the bottle, and interacts with the plugging body, in that it interdicts the flow from the outside to the inside of the bottle, whereas the compartment for the plugging body inside the pouring device is closed at its outward end by a part of the pourer, which is connected to the rest of the pourer by predeterminedly breaking zones, in such a way that, when an attempt is made to remove the pouring device from the bottle, by acting on its outward part, the latter breaks off from the inward part of the pouring device, preventing any further coupling thereto, freeing the plugging body and indicating the tampering.

Antifilling closing devices as this one are known, for example, from the patent EP-A-670271 belonging to the same patentee, and have the benefit of indicating the attempted tampering or sophistication of the packed product. In fact, the antifilling valve prevents the product from being replaced. The only filling possibility is by pulling out the pourer, containing the antifilling valve, by acting on its outer part. When a stress is exerted on the pourer in the direction of its removal from the mouth of the bottle, the predeterminedly breaking zones of its outward part cause it to irremediably break off from its inward part. Thus, the tampering action remains clearly visible. Moreover, since the plugging body is generally made of a gravity-operated ball, being free to move inside the tubular compartment of the pouring device, when the outer part of the latter breaks off, it causes the tubular compartment to open and the ball to come out of the inward part of the pouring device.

In known devices, the predeterminedly breaking zones are obtained by weakening, generally thinning, the wall of the pourer at predetermined areas thereof. The bridge/s of material, which connect the two parts of the pourer, are oriented in the axial direction thereof, i.e. parallel to the tensile force exerted in the pulling out direction, therefore they do not always ensure that the outer part of the pourer breaks off.

Furthermore, since the above mentioned devices are force mounted, there cannot be provided that the walls of the pouring device be thinned enough as to ensure their breaking, as said thinning, or weakening, must securely support the pressures exerted thereupon upon mounting.

The invention is aimed at improving the antifilling devices as described hereinbefore, in such a way as to obviate the drawbacks of known devices, ensuring a sufficient resistance of the pouring device to mounting stresses, and a sure break-off of the outward part of the

pourer upon attempted removal.

The invention achieves the above objects with a device as described hereinbefore, in which the predeterminedly breaking zones, connecting the two parts of the pouring device, briefly named pourer, are made of at least one weakened wall, having an at least inclined or perpendicular orientation with respect to the axis of the pourer, i.e. with respect to the direction of its removal from the mouth of the bottle.

The weakened wall, transversely oriented, is stressed in a direction transverse to itself, when an attempt is made of pulling the pouring device out, and it breaks more surely than under a stress parallel to the extension of the weakened area, in the traction direction.

According to another characteristic of the invention, in order to make the weakened zones more resistant to mounting stress, there are provided antibreaking means for holding and supporting the predeterminedly breaking weakened wall against the compressing stress onto or into the mouth of the bottle. Particularly, said means may comprise, independently or in combination, means for axial support, means for limiting the elastic deformation of the predeterminedly breaking weakened zones in the compression direction and means for axially securing the predeterminedly breaking zones at a predefined position.

Such flexion limiting means may be provided at axial stopping or supporting parts, for example elements of the capsule, particularly of the pouring device itself.

Particularly, when the predeterminedly breaking transverse wall is the wall of a neck or annular setback of the pourer, on the side facing the inside of the bottle, the opposite transverse wall has, on the side facing the predeterminedly breaking weakened wall, one or more projections for limiting the bending stroke of the transverse weakened wall.

These projections may consist of a crown of single equally spaced projections, or of a continuous annular projection, and are coincident with axial nerves or ribs substantially parallel to the direction of engagement of the pouring device into the mouth of the bottle.

The invention also relates to other improvements which form the subject of the dependent claims.

The characteristics of the invention and the advantages deriving therefrom will be understood more clearly from the following description of certain non limiting embodiments illustrated in the accompanying drawings, in which:

Fig. 1 is a sectional view, with respect to a diametrical axial plane, of a first embodiment according to the invention.

Fig. 2 shows the device of fig. 1 when mounted to the mouth of a bottle.

Fig. 3 is a view like that of fig. 1, with the device according to the invention in a decomposed condi-

tion.

Fig. 4 is a top plan view on the outward part of the pouring device.

Fig. 5 is a lateral view of the part of the pouring device according to fig. 3.

Fig. 6 shows a detail of a magnified diametrical section of the part of the pourer on the outward side thereof, according to a variant embodiment, specifically suitable for the devices being flush with the bottle mouth.

Referring to the figures, an antifilling closing device, particularly for bottles, or similar, is composed of a pouring device, or more briefly and simply pourer 1, generally made of plastic, which is a non-return valve to prevent the bottle from being filled, allowing to freely pour the contents thereof.

The cylindrical pourer 1 is outwardly provided, in the area which is meant for force-engagement into the mouth 2 of the bottle, with outer, substantially radial, annular and elastic flanges 3. The pourer 1 has, inside it, a cylindrical compartment 4 communicating with the inside of the bottle B through a central opening 5 at the inward end of the pourer, which opening may be closed by means of a ball-like plugging body 6, which is gravity-operated and may move freely, axially to the pourer 1, between a closing position and an opening position of the passage opening 5.

Preferably, the diameter of the compartment 4 for the plugging body 6 is greater than that of the ball, with the ball being held substantially centered by means of radial guiding ribs 7 uniformly arranged all along the wall of the compartment 5.

The opposite end, that is the outward end, of the pouring device 1 is closed by an element 8, which has a flange 9 superimposed on the lateral edge of the mouth of the bottle, and bears in a central area, coaxial to the compartment, a basket 10, having substantially coaxial pouring openings 11.

The basket 10 has, in its central area, an inverted cup-shaped element 12, extending upwards up to about the level of the flange 9 superimposed on the edge of the mouth 2 of the bottle B, and whose terminal part, facing the ball 6, has a concave, preferably spherical shape, acting as a compartment for the ball 6, when the latter is in the pouring condition.

The central basket 10 is held suspended in the central area of the compartment 4 for the ball by the flange 9, superimposed on the edge of the mouth of the bottle, whereas the combination of superimposed flange 9 and basket 10 is connected, by a relatively thin radial annular wall 13 to a ring 14, fastening the closing part 8 of the pourer to the inward part thereof, which may be force-secured into the mouth 2 of the bottle B.

The fastening ring 14 has, on its outer periphery, at least one annular tooth 15, preferably having a saw-tooth cross section, for snap engagement with an annular groove 16 in the inner wall of the compartment 4 for

the ball 6. Preferably, the fastening ring 14 and the wall of the compartment 4 have two annular teeth 15 and two annular grooves 16 respectively. The diameters are chosen in such a way as to ensure a sealing contact between the two walls. The annular teeth 15, as well as the corresponding grooves 16, may include two or more teeth and two or more notches, distributed along the perimeter of the corresponding parts. When they are coupled, the fastening ring 14 rests on inner radial shoulders 18 of the compartment 4 for the ball 6, particularly consisting of the ends of the guiding ribs 7 for the ball 6.

The annular radial wall 13 is preferably continuous and made to be so thin, that an attempted removal of the pouring device 1 from the bottle neck, by lifting the flange 9 from the edge of the mouth 2 of the bottle B certainly causes the wall 13 to break and the combination of central basket 12 and superimposed flange 9 to break off. Said two parts may no longer be coupled to the rest of the pourer 1, and their removal causes the compartment 4 to open at the end outside the bottle, and, consequently the ball 6 to come out. Thus, an attempted sophistication of the product, i.e. filling the bottle with a different product is readily signaled to the user, as it is immediately possible to detect that the part on the outer side of the pourer 1, made of the superimposed flange 9 and the central basket 12 is lacking, as well as the ball 6. If they were simply laid down in their original position, then they would irremediably fall, when the bottle is overturned to pour the liquid.

A stopper 20 is associated to the pouring device 1, consisting of an outer cap made of a plastic metal material. The outer cap 21 comprises a part 121, meant to be wrapped around the bottle neck and a part 221, being provided with a thread (fig. 2) on mounting the device onto the bottle B, for example by roll forming on the outer thread 22 provided on the mouth 2 of the bottle B. The two capsule parts 20, 21, are connected by predeterminedly breaking means or, alternatively, by tear guarantee strips, indicated, as a whole, as 321.

On the inner end of the screw part of the stopper 221, a sealing disk 23 is fixed thereto, being engaged with its peripheral edge behind an annular shoulder 421 of the screw part of the stopper 221. This is preferably made of the same material as the pouring device 1, and has a first peripheral flexible sealing lip 24, which is meant to interact with the flange 9 superimposed on the edge of the mouth 2 of the bottle B. However, the main sealing action is provided at the central basket 10. The sealing disk 23 has a cylindrical protrusion 25, which is coaxial to the central basket 10, and is meant to sealingly interact with the cylindrical or substantially cylindrical edge of the central basket 10, particularly in the area in which the latter is jointed to the flange 9, superimposed on the edge of the mouth 2 of the bottle. The size of the basket 10, that is of its upper cylindrical part, and of the central cylindrical protrusion 25 of the sealing disk 23 are appropriately calibrated to ensure the necessary

sealing action.

Thanks to this expedient, the main sealing area between the sealing disk 23 and the pouring device is transferred to the axial, non-horizontal walls. With this arrangement, in the bottle rest condition, there is no easy settlement of possible remains, which might reduce the sealing action, when they are dried. Moreover, the penetrating action of the cylindrical projection 25 into the cylindrical mouth of the basket 10 performs, thanks to the screwing action, a certain cleaning action through the rubbing of the walls in mutual sealing contact, further preventing loss risks, due to product remains, not to mention that the vertical orientation of the sealing walls involves a certain defluxion of the remains from the sealing walls.

On the free edge of the cylindrical protrusion 25 of the sealing disk 23, there are provided at least two teeth, preferably a crown of teeth, meant for engagement, in the mounted position, behind the upper sides of the pouring openings 11. This enables to assemble all the parts of the device before mounting onto the bottle B, and thus to mount them as a whole thereon. Advantageously, the teeth 26 are made to be tapered towards the free end of the cylindrical protrusion, so as to facilitate the coupling operation. The elasticity of the material allows for an easy disengagement of the sealing disk from the central basket, being also facilitated by the rotation of the sealing disk 23 and by the progressive removal, upon rotation, of the threaded part of the stopper 221, the whole without damaging the weakened radial wall 13. To this end, the teeth 26 may also taper in the circumferential direction with a draft wall, towards the outer surface of the cylindrical protrusion 25, frontally with respect to the direction of the unscrewing rotation of the stopper 221.

In an area substantially coinciding with the ring for fastening the part of the pourer 1 on the outer side of the mouth 2 of the bottle, the sealing ring 23 has another annular projection 28, coaxial to said fastening ring 14. This axial annular projection 28 has the function to evenly distribute the compressive force while mounting the device onto the mouth of the bottle, so as to prevent the device from being deformed or damaged. Further, the radial, annular offset being provided by the predeterminedly breaking annular wall 13 and by the radially inner part of the flange 9, superimposed on the mouth 2 of the bottle, is interposed between said annular, axial projection 28 and the fastening ring 14, which, in turn, is born, in the axial direction, by the ends 18 of the axial guiding ribs 7 for the ball 6.

In this way, the fastening ring 14 and the axial annular projection 28 are means for securing the weakened radial wall 13, preventing it from being excessively deformed, while allowing for the transmission of the necessary force for mounting the device onto the bottle B.

Also, advantageously, in order to provide that at least the weakened radial wall 13 be as thick and made

of such a relatively less elastic material, as to ensure a certain and easier breakage, when an attempt is made to pull out the pouring device, without running the risk that said predeterminedly breaking wall breaks while the device is being mounted onto the bottle, there are provided, on the side of the flange 9 facing the bottle, some projections 27, for reducing the bending stroke. The thickness of the projections 27 is such, that they limit the flexion of the predeterminedly breaking annular wall 13, within levels being compatible with the material in use, to prevent it from being broken by a mounting stress. The construction is such, that in the mounting stress condition, the predeterminedly breaking wall 13 is unremovably secured, and subject to a slight deformation within its own intrinsic elasticity range, between two stops which securely prevent it from being any further deformed, and thus, from undesirably break.

The projections 27 may also consist of a continuous axial annular projection. Particularly, as shown in the illustrated embodiment, the projections are preferably equally spaced, and distributed all over the predeterminedly breaking annular wall 13. Advantageously, the projections 27 are made to be substantially axially coincident with the axial guiding ribs 7 for the ball 6.

The construction of the device described with reference to figures 1 to 5 is particularly suitable for antifilling closing devices in which the available radial span is sufficient for a predeterminedly breaking wall, having a perfectly radial orientation, as when the outward part of the antifilling pouring device 1 is substantially superimposed on the edge of the mouth 2.

On the contrary, when the span of the bottle mouth 2 is particularly small, or in the case of antifilling capsules being flush with the bottle mouth, in which the outer part of the pouring device is made of a thin annular flange 9', the invention provides that the predeterminedly breaking annular wall 13' has an inclined, substantially truncated cone-shaped profile.

This expedient is shown in figure 6, which, for the sake of simplicity, only shows the outward part of the pouring device 1. As is clearly shown in figure 6, excepting the orientation of the predeterminedly breaking wall 13', the construction according to fig. 6 is substantially identical to that according to the previous figures, if the dimensional differences and the construction variants involved thereby are accounted for.

In spite of the non perfectly radial profile of the predeterminedly breakable wall 13, at least one component of the force exerted when pulling out the pouring device 1 acts transversely to the predeterminedly breaking wall 13', providing a higher certainty that it will be broken. All this may be compensated by a proper dimensioning of the thickness of the predeterminedly breakable wall 13, and/or by a proper choice of its material.

Naturally, the invention is not limited to the embodiments described and illustrated herein, but may be greatly varied, especially as regards construction, without departure from the guiding principle disclosed

above and claimed below.

### Claims

1. An antifilling closing device for bottles, or similar, comprising a pouring device (1), more simply named pourer, and meant for forcing and sealing engagement into the mouth (2) of a bottle (B), or similar, and which comprises a plugging body (6), generally a ball, which is held in one passage chamber (4) between at least between at least one exit or pouring opening (11) and one passage opening (5) which communicates with the inside of the bottle (B), and interacts with the plugging body (6), in that it interdicts the flow from the outside to the inside of the bottle (B), whereas the compartment (4) for the plugging body (6) inside the pouring device (1) is closed at its outward end by a part of the pourer, which is connected to the rest of it by predeterminedly breaking zones (13, 13'), in such a way that, when an attempt is made to remove the pourer (1) from the mouth (2) of the bottle (B), by acting on its outward part, the latter breaks off from the inward part of the pouring device (1), preventing any further coupling thereto, freeing the plugging body (6) and indicating the tampering, characterized in that the predeterminedly breaking zones (13, 13') for connecting the two parts of the pourer (1) are made of at least one weakened wall and have an at least inclined and particularly transverse or perpendicular orientation with respect to the axis of the pourer (1), i.e. with respect to the direction of its removal from the mouth (2) of the bottle (B). 5
2. Device as claimed in claim 1, characterized in that the predeterminedly breaking connecting wall (13, 13') is an annular or cone-shaped wall, which may be continuous or made of single spaced tongues. 10
3. Device as claimed in claims 1 or 2, characterized in that it has antibreaking means for holding and supporting the wall (13, 13') against the compressing stress onto or into the mouth (2) of the bottle (B). 15
4. Device as claimed in claim 3, characterized in that the antibreaking holding and supporting means consist of axially bearing stops (7, 18) on the predeterminedly breaking wall (13, 13'), on the side facing the inside of the bottle (B). 20
5. Device as claimed in claims 3 or 4, characterized in that the antibreaking holding and supporting means consist of means for limiting the flexion and/or the deformation of the predeterminedly breaking wall (13, 13'). 25
6. Device as claimed in one or more of the preceding claims 3 to 5, characterized in that the antibreaking means for holding and supporting the predeterminedly breaking wall (13, 13') consist of means for securing the predeterminedly breaking wall (13, 13') in a predefined position against an axial compressive stress of the pourer (1), when it is introduced onto or into the mouth (2) of the bottle. 30
7. Device as claimed in one or more of the preceding claims, characterized in that the predeterminedly breaking wall (13, 13') with an inclined, transverse or radial orientation is the wall on the inward side of an offset or annular neck of the pourer (1), i.e. of the area connecting the part facing the outside and the part facing the inside of the bottle (B), the other wall of the offset, opposite to the predeterminedly breaking wall (13, 13') being provided with an annular continuous projection or with single projections (27) distributed all over the annular offset, and projecting towards the predeterminedly breaking wall (13, 13'), reducing the distance between said two walls, and having the function of limiting the flexion of the predeterminedly breaking wall (13, 13'), against the axial compressive stress exerted while mounting the pourer (1) onto or into the mouth (2) of the bottle (B). 35
8. Device as claimed in one or more of the preceding claims, characterized in that an upper sealing disk (3) is associated to the pourer (1), and is provided with at least one axial annular projection (28), coincident with the predeterminedly breaking wall (13, 13'), and interacting with stopping means (14) on the opposite side of the predeterminedly breaking wall (13) for securing in a predeterminedly position and within the flexion and elastic deformation limits, the predeterminedly breaking wall (13, 13') when it is stressed by pressing the pourer (1) onto or into the mouth (2) of the bottle (B). 40
9. Device as claimed in one or more preceding claims, characterized in that the sealing disk has means for snap engagement (25, 26) with the pourer (1, 10, 11). 45
10. Device as claimed in one or more of the preceding claims, characterized in that the sealing disk (23) is engaged or fixed to an outer cap made of metal, which is meant to form a collar (121) of a screw stopper (221) on the outward side of the neck and of the mouth (2) of the bottle (B) respectively. 50
11. Device as claimed in one or more of the preceding claims, characterized in that the sealing disk (23) has main sealing means (25), interacting with the antifilling pourer (1), the walls in mutual sealing contact (10, 25) of said two parts, being oriented substantially axially to the mouth (2) of the bottle (B) 55

that is in the defluxion direction.

12. Device as claimed in claim 11, characterized in that the main sealing means (25) associated to the sealing disk (23) are provided in the central area of the mouth (2) of the bottle (B). 5

13. Device as claimed in claim 12, characterized in that the outward part of the pourer (1) is provided with a plurality of pouring openings (11) made in a central body which has the form of a basket (10), and is supported to be coaxial and protruding inside the compartment (4) of the pourer (1) by the offset or annular neck, one of whose walls is the transverse, weakened, predeterminedly breaking wall (13, 13'), being connected to the inward part of the pourer (1), whereas in the bottom area of the offset or annular neck, there is provided the mouth of the basket (10), having a cylindrical portion, which interacts with a cylindrical complementary protrusion (25) of the sealing disk (23). 10 15 20

14. Device as claimed in claim 13, characterized in that the sealing disk and the pourer (1) have interacting peripheral and substantially horizontal sealing surfaces (9, 24). 25

15. Closing device with antifilling valve for bottles, or similar, wholly or partially as described, illustrated and for the objects stated herein. 30

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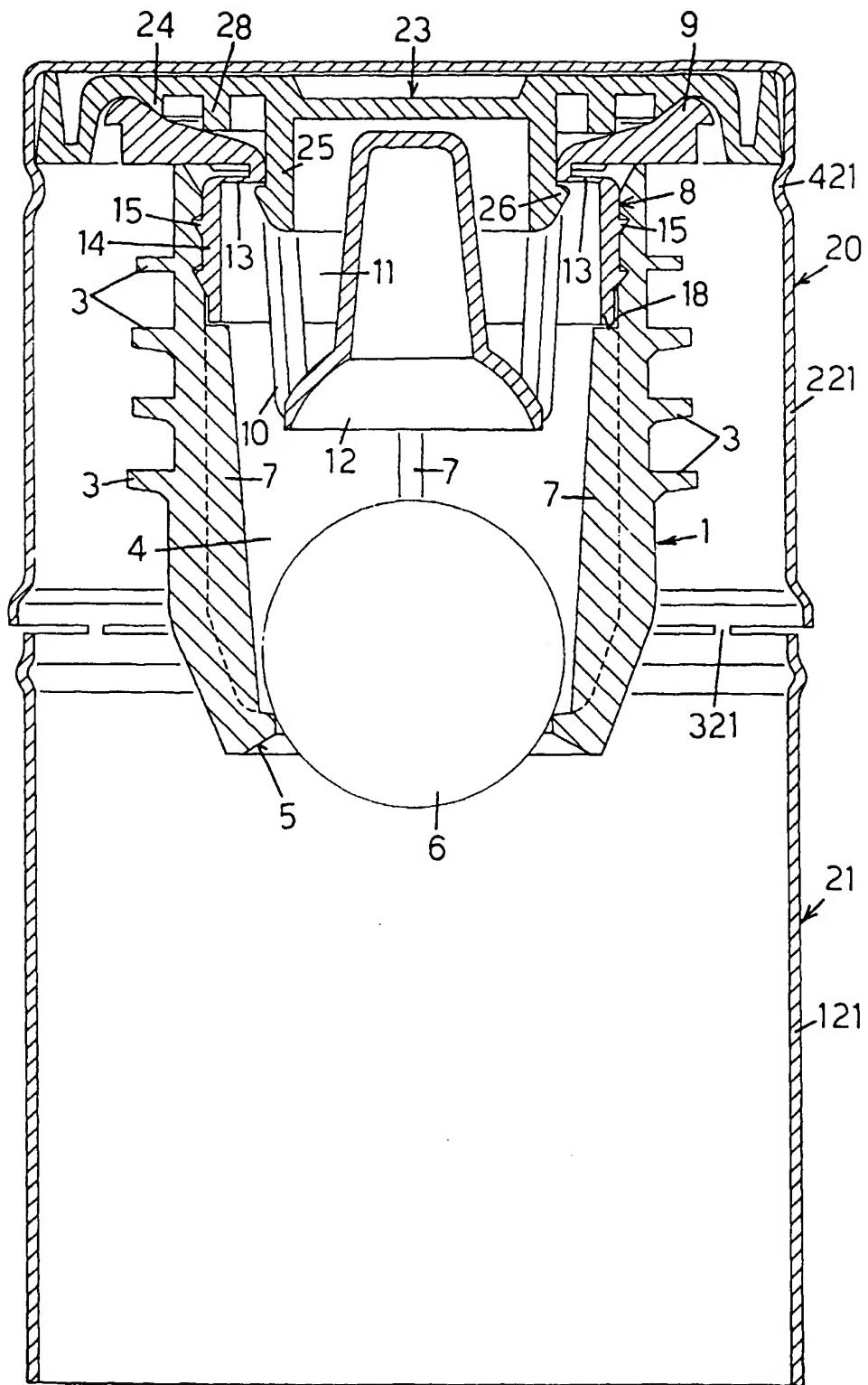


FIG. 1

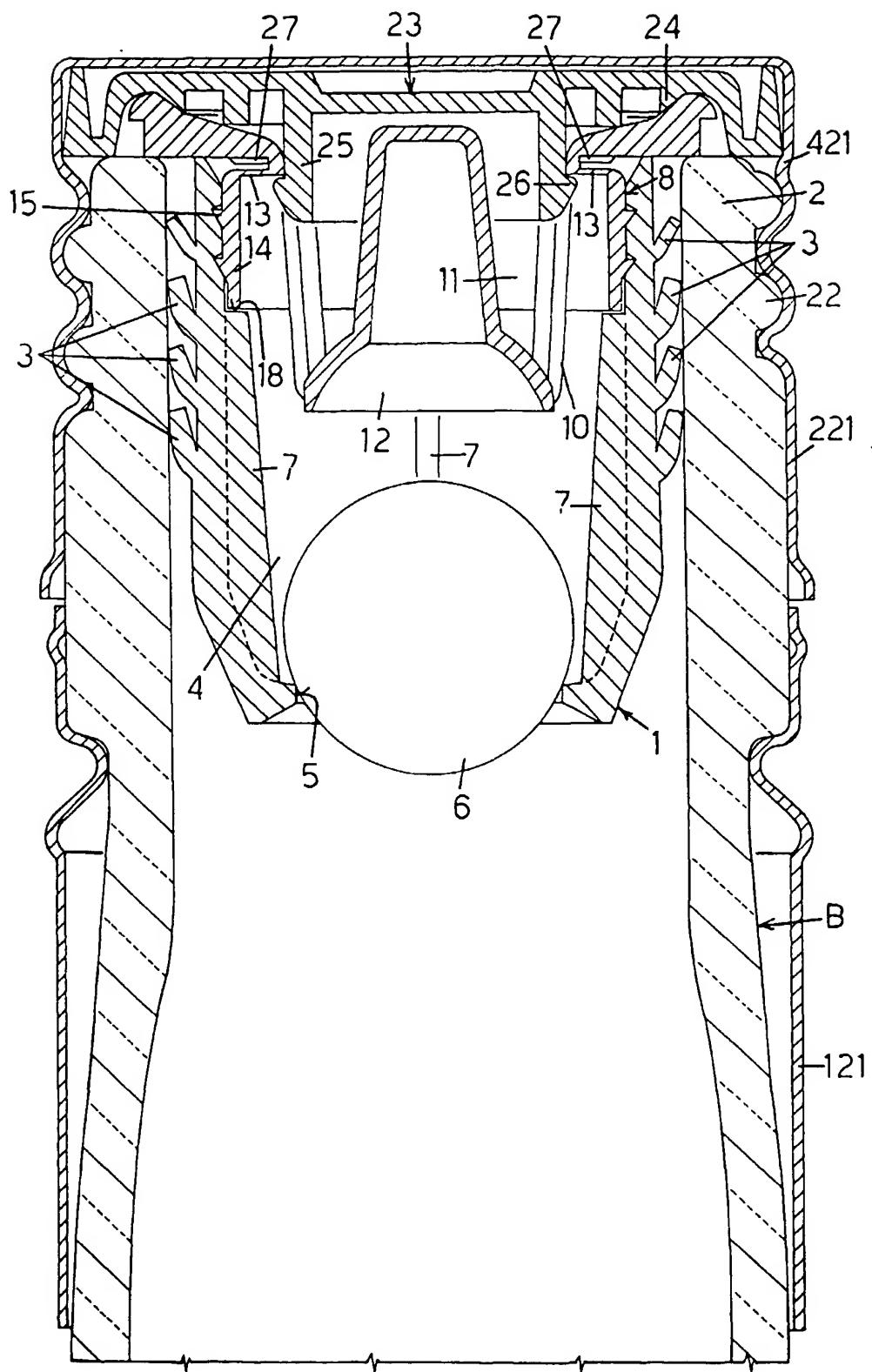


FIG.2

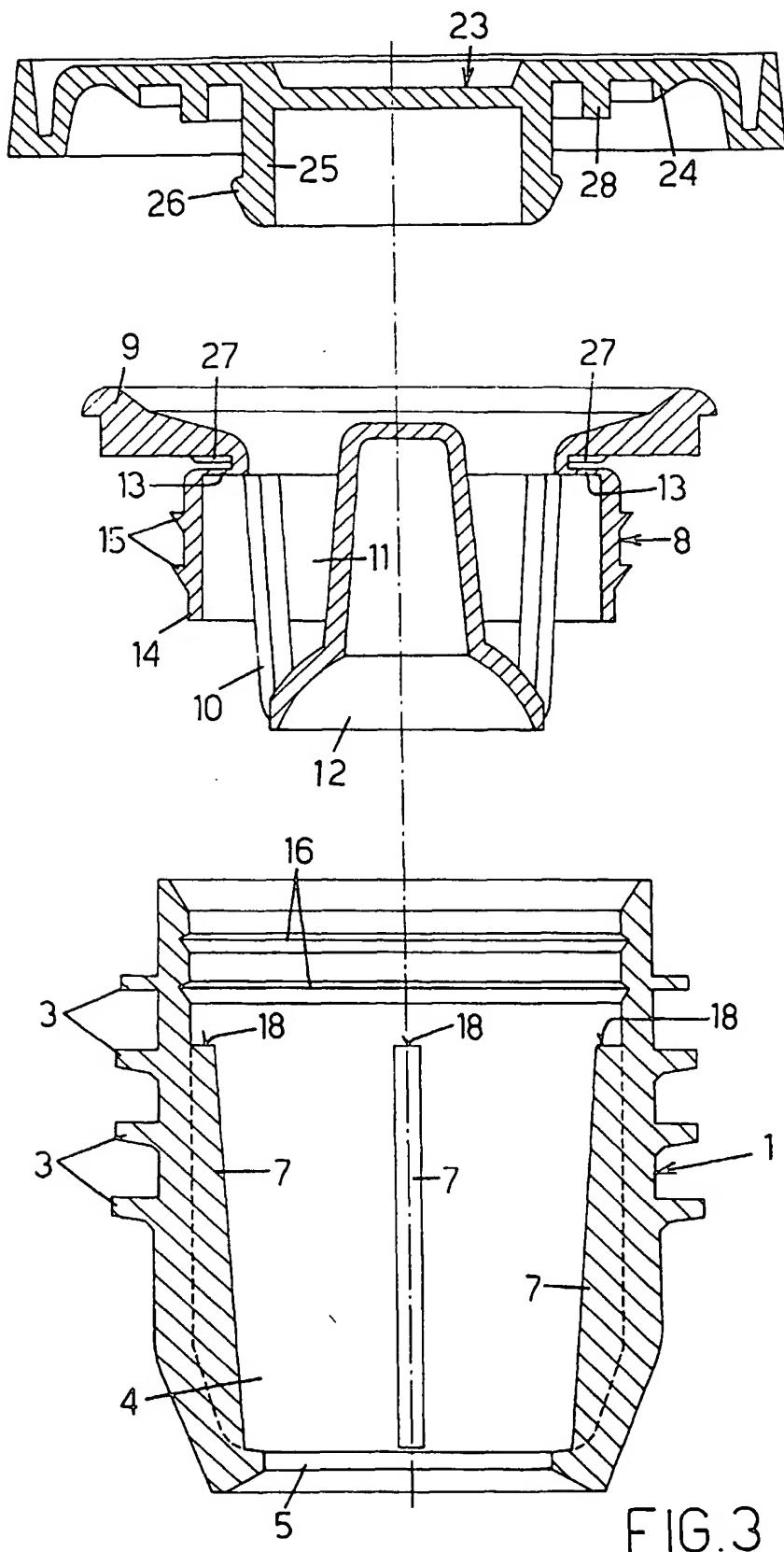


FIG.3

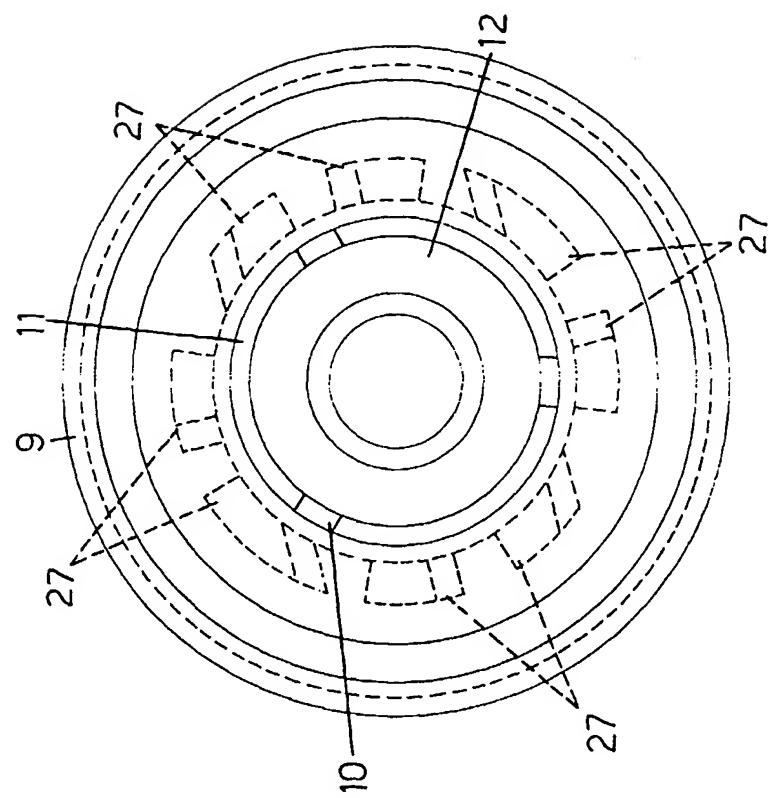


FIG. 4

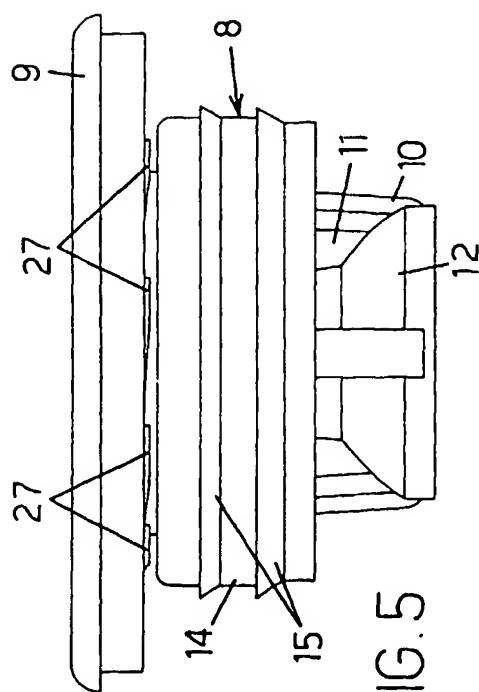


FIG. 5

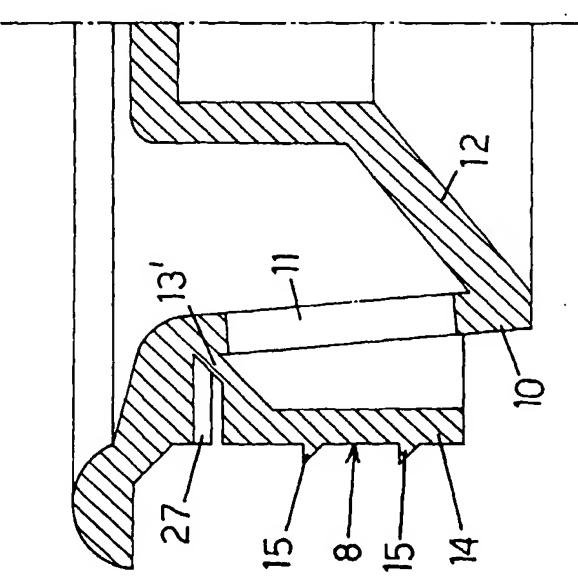


FIG. 6



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## EUROPEAN SEARCH REPORT

**Application Number**

EP 97 11 5775

| DOCUMENTS CONSIDERED TO BE RELEVANT  |  |                   |  |  |  |
|--|--|-------------------|--|--|--|
| Category   | Citation of document with indication, where appropriate, of relevant passages                        | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |  |  |
| X  | GB 2 057 390 A (DANIEL MONTGOMERY & SON LTD.)<br>* page 2, line 10 - line 99; figures 1,2 *          | 1-6               | B65D49/04                                    |  |  |
| Y  | ---  | 8-14              |  |  |  |
| X  | GB 2 195 974 A (DANIEL MONTGOMERY & SON LTD.)<br>* page 1, line 62 - line 106; figures 1,2 *         | 1-6               |  |  |  |
| X  | ---  |                   |  |  |  |
| X  | EP 0 367 427 A (CMB PACKAGING (UK) LTD)<br>* column 2, line 48 - column 3, line 24;<br>figures 1,2 * | 1                 |  |  |  |
| X  | ---  |                   |  |  |  |
| X  | EP 0 249 438 A (UNITED GLASS LTD.)<br>* column 3, line 8 - line 41; figure 1 *                       | 1,7               |  |  |  |
| Y,D  | ---  |                   |  |  |  |
| Y,D  | EP 0 670 271 A (ALUCAPVIT S.P.A.)<br>* figures 1-7 *   | 8-14              |  |  |  |
| X  | ---  |                   |  |  |  |
| X  | GB 2 244 048 A (DANIEL MONTGOMERY & SON LTD.)<br>* page 5, line 1 - line 20; figures 1,2 *           | 1                 |  |  |  |
|  | -----  |                   |  |  |  |
|  |  |                   | TECHNICAL FIELDS<br>SEARCHED (Int.Cl.6)      |  |  |
|  |  |                   | B65D   |  |  |
| A search report has been drawn up after all claims                               |  |                   |  |  |  |
| Place of search  | Date of completion of the search   | Examiner          |  |  |  |
| THE HAGUE  | 17 February 1998   | Berrington, N     |  |  |  |
| CATEGORY OF CITED DOCUMENTS  |  |                   |  |  |  |
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| P : intermediate document  | & : member of the same patent family, corresponding<br>document                                      |                   |  |  |  |



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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims: **1 - 14**
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.